

Claims:

- 1 A method of converting from a sub-sampled color image in a first color  
 2 space format to a full color image in a second color space format comprising:  
 3 transforming the sub-sampled color image in the first color space format  
 4 to the second color space format; and  
 5 upscaling at least one color plane of the transformed image, the one color  
 6 plane corresponding to one of the color space dimensions of the second color  
 7 space format, to provide the full color image in the second color space format.
- 1 2. The method of claim 1, wherein the first color space format is the RGB  
 2 color space format.
- 1 3. The method of claim 2, wherein the second color space format is the  
 2 Y-Cr-Cb 4:2:0 color space format.
- 1 4. The method of claim 1, wherein the first and second color space formats  
 2 comprise two different luminance-chrominance color space formats.
- 1 5. The method of claim 1, wherein transforming comprises applying a  
 2 relationship to at least one pixel value of the image in the first color space format  
 3 to obtain a pixel value in the second color space format.

6. The method of claim 5, wherein transforming comprises applying the relationship to more than at least one pixel value of the image in the first color space format.

7. The method of claim 5, wherein the relationship is substantially in accordance with the following equations:

$$Y(I,J) = 0.299R(I,J) + 0.587G(I,J) + 0.114B(I,J)$$

$$Cr(I,J) = -0.169R(I,J) - 0.331G(I,J) + 0.500B(I,J)$$

$$Cb(I,J) = 0.500R(I,J) - 0.419G(I,J) - 0.081B(I,J)$$

where R,G, and B denote different color planes in the RGB color space format, Y, Cr, and Cb denote different color planes in the Y-Cr-Cb 4:2:0 color space format, and I,J denote pixel locations.

8. The method of claim 1, wherein upscaling comprises applying an Inverse discrete wavelet transform to an image decomposed into subbands, at least one of the subbands comprising the at least one color plane of the transformed image.

9. The method of claim 8, wherein the at least one of the subbands comprises an LL subband of the decomposed image.

1 10. The method of claim 9, wherein the remaining subbands of the  
2 decomposed image comprise only zeros.

1 11. An article comprising: a storage medium having stored thereon  
2 instructions to convert from a sub-sampled color image in a first color space  
3 format to a full color image in a second color space format, the instructions,  
4 when executed by a system, resulting in:

5 transforming the sub-sampled color image in the first color space format  
6 to the second color space format; and

7 upscaling at least one color plane of the transformed image, the one color  
8 plane corresponding to one of the color space dimensions of the second color  
9 space format, to provide the full color image in the second color space format.

1 12. The article of claim 11, wherein the first color space format is the RGB  
2 color space format.

1 13. The article of claim 12, wherein the second color space format is the  
2 Y-Cr-Cb 4:2:0 color space format.

1 14. The article of claim 11, wherein the first and second color space formats  
2 comprise two different luminance-chrominance color space formats.

1 15. The article of claim 11, wherein the instructions, when executed, further  
 2 result in transforming the color image comprising applying a relationship to at  
 3 least one pixel value of the image in the first color space format to obtain a pixel  
 4 value in the second color space format.

1 16. The article of claim 15, wherein the instructions, when executed, further  
 2 result in the relationship being applied substantially in accordance with the  
 3 following equations:

$$Y(I,J) = 0.299R(I,J) + 0.587G(I,J) + 0.114B(I,J)$$

$$Cr(I,J) = -0.169R(I,J) - 0.331G(I,J) + 0.500B(I,J)$$

$$Cb(I,J) = 0.500R(I,J) - 0.419G(I,J) - 0.081B(I,J)$$

7 where R,G, and B denote different color planes in the RGB color space  
 8 format, Y, Cr, and Cb denote different color planes in the Y-Cr-Cb 4:2:0 color  
 9 space format, and I,J denote pixel locations.

1 17. The article of claim 11, wherein the instructions, when executed, further  
 2 result in upscaling at least one color plane comprising applying an Inverse  
 3 discrete wavelet transform to an image decomposed into subbands, at least one  
 4 of the subbands comprising the at least one color plane of the transformed  
 5 image.

1 18. The article of claim 17, wherein the instructions, when executed, further  
2 result in the at least one of the subbands comprising an LL subband of the  
3 decomposed image.

1 19. The article of claim 18, wherein the instructions, when executed, further  
2 result in the remaining subbands of the decomposed image comprise only zeros.

1 20. A method of converting a subsampled color image transformed to a  
2 selected color space format to a full color image in the selected color space  
3 format comprising:

4 appending zero subbands to at least one of the color planes of the  
5 transformed color image so that the at least one of the color planes forms an LL  
6 subband of a decomposed image and the appended subbands form LH, HL,  
7 and LL subbands of a decomposed image; and

8 applying the inverse discrete wavelet transform to the decomposed image  
9 so as to form the full color image in the selected color space format.

1 21. The method of claim 20, wherein the selected color space format  
2 comprises the Y-Cr-Cb 4:2:0 color space format.